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A POLICY PERSPECTIVE OF COAL DEPENDANCE IN JHARKHAND: ANALYSIS AND POSSIBLE SOLUTIONS

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This brief discusses the versatile nature of coal dependence in Jharkhand and the institutional, financial, and social challenges associated with its transitions away from coal. It further delves into analysis of the major barriers to transition and provides policy recommendations to expand clean energy in the state with minimum effect on its economy.

INTRODUCTION

As the largest coal producing state in India with 30% of the country's proven coal reserves, Jharkhand poses complex challenges for a transition away from coal. Of its 4899.32 MW of installed power capacity (central, state, and private), a mere 0.7% comes from Renewable Energy Sources (RES), 5.5% comes from hydro, and over 94% comes from coal. This far exceeds the 64% national average coal dependence for power. Jharkhand also has the highest average daily employment in coal mines, with expansive informal mining, making the nature of coal dependence more versatile than mere power reliance. Coupled with weak institutional capacity for Renewable Energy (RE), challenges of financing, and an implicit resistance to move away from coal, the question arises that how can Jharkhand sustainably move towards clean energy.

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THE CASE OF COAL DEPENDENCE

If you travel from Hazaribagh to Barkagaon via NH20 in the state of Jharkhand in Eastern India, parallel to you runs a 14-km long, 12-feet wide coal conveyor belt. If you make this journey at 6 in the morning, at another parallel runs a queue of bicycle riders sneaking away bundles of coal in jute bags held together, mostly by faith, in the carrier behind. This view in essence sums up the dichotomy of coal dependence in Jharkhand. A formal economy making long-term investments for extraction, and a decades-old informal economy building its sustenance around it.

The power sector in Jharkhand is distinguished because it is served by multiple distribution licensees viz. Jharkhand Bijli Vitaran Nigam Limited (JBVNL), Damodar Valley Corporation (DVC), Tata Steel, Jamshedpur utility Services Company Limited (JUSCO), and Steel Authority of India Limited (SAIL) Bokaro. The state distribution utility, JBVNL, has an installed capacity of 1,775.26 MW out of which 40.52 MW is RES, 191 MW is hydro, and 1,543.74 MW is thermal.

JBVNL has consistently failed to meet its Renewable Purchase Obligation (RPO). In 2017, 0.31% against a 5.30% RPO target was achieved, whereas in 2018, 0.32% against an RPO of 7.75% was achieved. It has 25-year long Power Purchase Agreements (PPAs) with thermal power plants, with the latest PPA signed as late as last year (2018). Notably, thermal power plants in Jharkhand are operating at only 61% to 79% of their full capacity, even as new thermal plants are being commissioned. Since demand is cyclical in nature, coal plants perform at suboptimal loads during off-peak hours even as they struggle to meet demand during peak hours, resulting in a lower PLF (Plant Load Factor).

POLICY DEVELOPMENTS IN THE STATE

The state government has set ambitious targets for renewable energy deployment in the state, with a renewable energy generation mix of 14.8% by 2021, 29% by 2025, and 30% by 2030. Jharkhand's Solar Power Policy (2015) aims to push total solar power production capacity to 2,650 MW by the year 2020 from an erstwhile 40 MW of RE generation.

The Solar Power Policy gave deemed 'industry' status to solar power producers, tax exemption for installing solar power plants, and exemption from payment of electricity duty for 10 years. Further, the state is soon going to launch a new policy regarding grid connected solar rooftop and ground mounted small solar plants within consumer premises. The policy will provide tariffs for injection of surplus electricity into grid, third party investment in rooftop solar for consumers, and 'group net metering' where surplus injection into the grid from one location can be adjusted into the electricity connection at another location for consumers with multiple buildings and service connections.

PPAs between Solar Energy Corporation of India (SECI) and JBVNL are in the pipeline totaling upto 1,526 MW of solar and wind power, some of which are already supplying power while others are commissioned with an expected supply by 2020. At the same time, thermal power projects with an allocated capacity of 6,078 MW for Jharkhand are also in the pipeline by state, central, and joint ventures to be commissioned as early as February 2020. Under *Saubhagya* scheme, the energy department is electrifying off-grid villages via solar stand-alone systems. In addition, solar PV micro-grids are being installed in off-grid villages under the Decentralised Distributed Generation (DDG) scheme. A catch, however, is that the batteries provided with these solar stand-alone systems have a maximum life span of 5 years. Thus, there is little clarity on whether the government will replace the batteries after 5 years, or whether it is a buffer until grid-connected coal-generated power reaches these villages.

CHALLENGES IN RENEWABLE ENERGY TRANSITION

Jharkhand faces four types of challenges as it strives to meet its clean energy goals:

1) **Balancing generation:** A key challenge with RE is the variability across time of day and across seasons. This requires states to maintain an alternate capacity (such as coal, gas, etc.) to balance generation during peak demand when RE output is low. Tamil Nadu – an Indian state in the Southern region - has 12.8 GW of installed RE capacity. In a case study conducted on a good wind generation day, it was observed that Tamil Nadu experienced peak demand of 13,483 MW at 7:30 pm. RE generation peaked at 3 pm for wind (4,758 MW) & 9:30 am for solar (892 MW). While solar and wind were complementary in meeting demand during the day, the state relied on an almost constant gas generation (254 MW) and thermal generation (2,644 MW) to meet peak demand at 7:30 pm. The generation that was allowed to fluctuate was hydro power- that operated at 115 MW during off peak and 1,006 MW during peak. The state also relied on requisitioning from Central Generating Stations (3,472 MW during peak). This balancing generation cost the state of Tamil Nadu INR 1.57 per unit. On similar lines, the state of Gujarat, in the West, relied heavily on gas and thermal to balance demand due to variability of RE, at a cost of INR 1.45 per unit.

   Extrapolating to the case of Jharkhand, the state has no installed gas capacity, and an insufficient hydro generation capacity (191 MW) to balance demand. This means that during peak hours with low RE, the state has to rely on varying its coal generation to balance demand, which in turn compromises the efficiency of power plants, causes wear and tear from thermal stress, and higher tariffs due to low PLF. The state could requisition power from Central Generating Stations, which are coal/ lignite/ gas based, but these are ancillary services and hence, are not deemed reliable. This exposes a critical gap in Jharkhand's ability to reduce coal dependence even as it transitions to RE.

2) **Infrastructure and Financing:** An analysis by Ministry of New and Renewable Energy (MNRE) estimated solar power potential of Jharkhand to be 18,000 MW, considering if the 3% of wasteland in the state is used for solar power projects. The state has drafted a commendable solar energy policy as a result of which consumers will soon become 'pro-sumers' i.e. contributing to renewable energy generation. However, Jharkhand lacks the smart grid infrastructure to support reverse power flow from the consumer into the low voltage grid. Further, on the business side, it lacks net metering and payment mechanisms for these 'pro-sumers'. Moreover, the current policy framework relies on individual initiative for installing solar rooftop. Individuals are likely to be deterred by the hassle effect of it: the nitty-gritties of financing it, installing it, and accounting mechanisms for injecting surplus to the grid.

3) **Institutional capacity:** Jharkhand Renewable Energy Development Agency (JREDA) is the state nodal agency for implementation of renewable energy projects, under the administrative control of the Department of Energy, Jharkhand. Until recently, JREDA was involved only in small-scale projects such as distributing solar lamps in the state. The agency is understaffed, and the post of Director is currently assigned only as an additional charge. With the state's RE ambitions, an incapacitated JREDA results in slower RE deployment, poor monitoring of RPO obligations for captive power plants, and weak institutional capacity to oversee RE transition.

4) **Local resistance to transition:** For a state with the highest average daily employment in coal mines (90.872 million people per day), in addition to an informal coal economy, coal is a political issue. Employment growth in the coal industry continues to fall due to mechanization. Even as productivity increases, with current daily employment half of what it was in 1996. In the absence of alternative livelihood options in coal-mining areas, the transition away from coal will result in income instability among dependent populations.

RECOMMENDATIONS

1) **Balancing generation:** To reduce balancing dependence on coal, geothermal potential of Jharkhand needs to be developed in addition to increasing its hydel capacity. Out of 340 geothermal sites identified in India, 60 are in Jharkhand, with potential for power stations ranging from 20 MW to 200 MW in prospective sites. Additionally, for integration of solar with thermal, the state needs investments in battery storage technology, smart grid, and better demand side management.

2) **Financing:** Foregoing reliance on individual initiative, the state needs to promote intermediary-based private solar financing via the Renewable Energy Services Company (RESCO) Model. Under this model, a third-party investor approaches the consumer (most of the times the roof owner) to install rooftop solar and sell power generated to the consumer. The consumer benefits from savings on electricity bill without making upfront investment in setting up the solar plant.

3) **Institutional Capacity:** The Department of Energy needs to do a budgetary and manpower overhaul of JREDA with significant capacity augmentation. The agency needs to be empowered for monitoring of captive power plant RPOs and faster RE deployment.

4) **Tackling Local Dependence:** District Mineral Foundation (DMF) is a fund financed via royalty collection from mining companies for the benefit of mining-affected population in every district. Part of DMF fund needs to be utilized for reducing employment dependence on coal through state-support for alternative livelihood sources such as forest products (mahua, bamboo, lemongrass oil, etc), cottage industries, agriculture, and animal husbandry. Promoting employment shift via DMF will in the long-term alleviate unemployment which will be inflicted on the local economy due to transitioning away from coal.

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